



STATEMENT OF BASIS
SPACE LAUNCH COMPLEX 40
SOLID WASTE MANAGEMENT UNIT NO. 46
45TH SPACE WING
CAPE CANAVERAL AIR FORCE STATION
BREVARD COUNTY, FLORIDA



PURPOSE OF STATEMENT OF BASIS

This Statement of Basis (SB) has been developed in order to inform the public and give the public an opportunity to comment on a proposed remedy to clean up contamination at the Space Launch Complex 40 (SLC-40). A 45th Space Wing (45th SW) installation restoration partnering (IRP) team consisting of United States Air Force (USAF), United States Environmental Protection Agency (USEPA), the State of Florida Department of Environmental Protection (FDEP), the U. S. Army Corps of Engineers, and various environmental consultants have determined that the proposed remedy is cost effective and protective of human health and the environment. However, prior to implementation of the proposed remedy, the 45th SW IRP team would like to give an opportunity for the public to comment on the proposed remedy. At any time during the

Brief Site Description

SLC-40 is located at the northern end of CCAFS, approximately 3,000 feet west of the Atlantic Ocean and 0.75 miles east of the Banana River (See Figure 1). The facility was constructed in 1964 for the Titan IIIC Missile program and continues to actively support the Titan program.

ments and issues raised in the comments and determine if there is a need to modify the proposed remedy prior to implementation.

public comment period, the public may comment as described in the "How Do You Participate" section of the SB. Upon closure of the public comment period, the 45th SW IRP team will evaluate all com-

**WHY IS
CLEANUP
NEEDED?**

The results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) indicated that manganese and iron (listed in Table 1) are present in the groundwater at levels that exceed Secondary Maximum Contaminant Levels (SMCLs) established by USEPA. Also, polychlorinated biphenyls (PCBs) are present in the surface soils at levels that could be potentially harmful to human health.

**HOW DO YOU
PARTICIPATE?**

The 45th SW IRP team solicits public review and comment on this SB prior to implementation of the proposed remedy as a final remedy. The final remedy for SLC-40

The Clean-up Remedy

The proposed clean-up remedy for SLC-40 includes (but is not limited to) the following components:

- Natural attenuation of groundwater to remove contaminants through natural processes
- Removal of remaining surface soils (those inside the fenceline) that exceed the 18 ppm site-specific clean-up standard for PCBs
- Implementation of land use controls designed to prevent exposure to site contaminants. These include:
 - Prohibition of residential development
 - Periodic monitoring of groundwater to document water quality and contaminant levels
 - Posting warning signs on-site

A complete list of land use controls and other protective measures are found in the SLC-40 Land Use Control Implementation Plan (LUCIP).

will eventually be incorporated into the Hazardous and Solid Waste Amendments (HSWA) Permit for Cape Canaveral Air Force Station (CCAFS).

The public comment period for this SB and the proposed remedy will begin on the date that a notice of the SB's availability is published in a major local newspaper of general circulation. The public comment period will end 45 days thereafter. If requested during the comment period, the 45th SW IRP team will hold a public meeting to respond to any oral comments or questions regarding the proposed remedy. To request a hearing or provide comments, contact the following person in writing within the 45-day comment period:

Mr. Jorge Caspary
FDEP-Bureau of Waste Cleanup
2600 Blair Stone Road, MS-4535
Tallahassee, FL 32399-2400
E-mail: Jorge.Caspary@dep.state.fl.us
Telephone: (850) 921-9986

The HSWA Permit, the SB, and the associated Administrative Record, including the RFI Report, will be available to the public for viewing and copying at:

Environmental Management, CEV/ESC
Facility 1638, Samuel Phillips Parkway
Cape Canaveral Air Force Station, FL
For public access call (321) 853-0965

This information can also be found on-line at http://www.mission-support.org/45SW_IRP_EA

The HSWA Permit, the SB, and SLC-40 Report summaries will be available for viewing and copying at:

Central Brevard Library
308 Forrest Avenue
Cocoa, FL, 32922

To request further information, you may c

contact one of the following people:
Ms. Teresa Green
Environmental Restoration Element Chief
45 CES/CEVR
1224 Jupiter Street
Patrick Air Force Base, FL 32925-3343
E-mail: teresa.green@patrick.af.mil
Telephone: (321) 853-0965

Mr. Jorge Caspary
See previous contact information

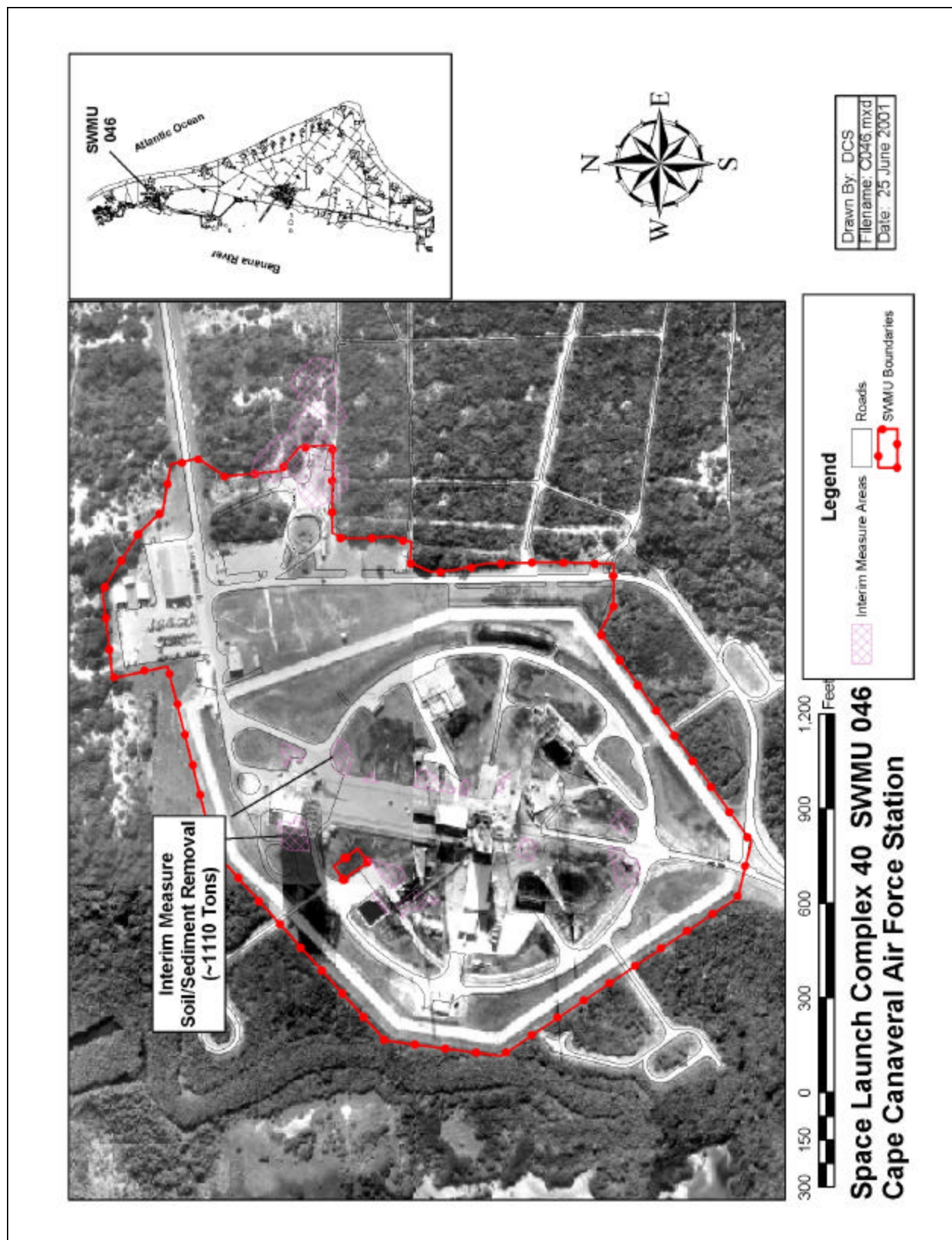
Mr. Timothy R. Woolheater, P. E.
EPA Federal Facilities Branch
Waste Management Division
Sam Nunn Atlanta Federal Center
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Atlanta, GA 30303-8960
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FACILITY DESCRIPTION

USAF established the 45th SW as the primary organization for the Department of Defense aerospace force programs. Historically, the National Aeronautics and Space Administration (NASA) also performed space launch related operations on the 45th SW property. These operations have involved the use of toxic and hazardous materials. Under RCRA and the HSWA Permit (CCAFS Permit No. FL2800016121) issued by the USEPA, the 45th SW was required to perform an investigation to determine the nature and extent of contamination from Solid Waste Management Unit (SWMU) No. 46, SLC-40.

SITE DESCRIPTION AND HISTORY

SLC-40 is located on CCAFS, approximately 3,000 feet west of the Atlantic Ocean and 0.75 miles east of the Banana River (See Figure 1). SLC-40 was constructed in 1964 for the Titan IIIC Missile Program, owned by the USAF, and operated by Martin Marietta and Pan Am/Johnson Controls. The launch complex continues to actively support the Titan Program. Various launch support buildings are located at the site and include a Ready



In accordance with RCRA Section 7004(b), this Statement of Basis summarizes the proposed remedy for CCAFS SLC-40. For detailed information, consult the SLC-40 RFI Report which is available for review at the 45th SW Environmental Management Office (See "How Do You Participate") or on-line at http://www.mission-support.org/45SW_IRP_EA.

Building, Complex Support Building, Protective Clothing Building, and Refrigeration Building. SLC-40 is currently surrounded by two security buildings and is a restricted access area that is only accessible to authorized personnel.

The Titan rockets utilize liquid fuels including hydrazine, nitrogen tetroxide, RP-1, and liquid oxygen. Solvents were used to flush rocket engine components. These and other hazardous materials were stored and used at various locations around SLC-40. During launch operations, thousands of gallons of water were used to suppress vibrations and for cooling purposes. These "deluge" waters were collected in a concrete flumeway and basin before being released to the environment.

It is suspected that the launch stand and other site support structures were painted with coatings that contained PCBs. It is believed that the PCBs helped the paint withstand the extreme temperatures generated at launch time. Discharge of contaminated deluge water and dispersion of the paint chips that resulted from sandblasting operations are considered the primary causes of site contamination

The USAF conducted the following investigations:

- 1990-1992: A Preliminary Assessment including records search, site reconnaissance, and interviews with knowledgeable aerospace personnel identified 21 areas of concerns which warranted further investigation. A Site Investigation (SI) was recommended to collect and analyze the site's environmental media (soil, groundwater, surface water, and sediment) to evaluate the presence or absence of contamination.
- 1992-1995: The SI report concluded that the presence of constituents in soil, groundwater, surface water and sediment might pose a risk to human health and the environment. The SI recommended that an RFI be conducted to assess the nature and

extent of the contamination present at the site, and perform risk assessments to determine if the contamination is detrimental to human or ecological health.

- 2000-2001: An Interim Measure was performed to remove PCB-contaminated soils located outside the secure area (the fenceline) at SLC-40. The clean-up action resulted in the removal of approximately 786 cubic yards (1,100 tons) of contaminated soil. The soils were removed to a concentration (2.2 mg/kg) that the RFI deemed would be protective of ecological receptors.
- 1998-1999: An RFI was performed, detailing the sampling and analyses of site soil, groundwater, surface water, and sediment. These results were used to determine human health and ecological risks. The Human Health Risk Assessment (HHRA) for human health indicated that potential risk exists from the sites groundwater and soils. The Ecological Risk Assessment (ERA) indicated that no unacceptable ecological risk is present at the site.
- 2000: A Corrective Measures Study (CMS) was performed in order to select the appropriate remedy for the site. It was determined that monitoring of groundwater would be needed, that a soil removal would be conducted to address all soils exceeding the site-specific human health cleanup criteria of 18 ppm, and that land use controls would be implemented to ensure hypothetical future residents and industrial workers would be protected from unacceptable exposure to site groundwater and remaining soils.
- 2001: A Long Term Monitoring (LTM) Workplan was submitted and LTM was initiated. The 45th SW IRP team felt it was incumbent to implement LTM immediately following the CMS in order to ensure that groundwater contaminants were appropriately monitored and tracked.

SUMMARY OF SITE RISK

As part of the RFI activities, an HHRA and an ERA were conducted to estimate the health and environmental risks associated with the site-specific contamination. The risk assessments were performed in accordance with risk management decision processes established by the USEPA, FDEP, and the USAF at the time the RFI was initiated.

The Chemicals of Concern (COCs) identified for human health during the RFI were:

- Groundwater: arsenic, bis(2-ethylhexyl) phthalate
- Soil: aroclor 1260

Sediment at the SLC-40 was not addressed in the human health risk assessment on the basis of incomplete exposure pathways for all potential receptors. Surface water was determined to pose no unacceptable human health risk or hazard. Soil exceeded the one in one million cancer risk threshold for five potential receptors (current and future industrial worker, future construction worker, hypothetical future adult and child residents) and the hazard index target value of 1.0 for three receptors (future construction worker and hypothetical future adult and child residents). The overwhelming majority of soil risk and hazard was attributed to aroclor 1260.

Following the RFI, a soil removal was completed in order to address PCB contamination outside the fenceline at SLC-40. These soils were remediated to 2.2 mg/kg, a level that would be protective of ecological receptors. Contaminants inside the fenceline still need to be addressed when launch-related activities permit. The goal of this soil removal is to eliminate unacceptable soil risk and hazard to current and future site workers and to reduce unacceptable risk to potential future residents. When site-specific conditions were factored into the risk assessment at SLC-40, it was determined that removal of aroclor 1260 concentrations greater than 18 ppm inside the fenceline (where access and exposure can be

restricted) would mitigate unacceptable soil risk as long as the facility remains a secure, limited-access, active launch facility.

Groundwater exceeded the one in one million cancer risk threshold for four potential receptors (future industrial worker, future construction worker, hypothetical future adult and child residents). Arsenic was the primary contributor to risk, although bis(2-ethylhexyl) phthalate also contributed significantly to risk for the future adult resident. However, when risk management factors were taken into consideration [arsenic concentrations were less than the MCL and bis(2-ethylhexyl)phthalate was also detected in blanks], groundwater was determined not to pose a significant human health risk or hazard. However, two metals (iron and manganese) exceeded SMCLs. Although these metals did not appear to significantly contribute to human health risk, the exceedance of an SMCL necessitates a long term monitoring program.

The ERA was conducted to evaluate the possibility that land and aquatic organisms (eco-receptors) may be at risk from site-related contaminants. The ERA was based on laboratory analyses of soil, surface water, and sediment samples. Groundwater was not evaluated in the ERA, as there is no identified exposure pathway.

The ERA concluded that potential risk from the exposure to and/or ingestion of soil, surface water, or sediment by eco-receptors is marginal. Several factors mitigate the potential concern. These could include routine facility operation and maintenance activities, less than optimal habitat found within facility boundaries, the extent of the eco-receptor's normal foraging area, and the seasonal variability associated with the amount of surface water present at any given time.

WHAT ARE THE CLEANUP OBJECTIVES AND LEVELS?

The remedial action objectives (RAOs) are to:

- 1) Protect humans from exposure to shallow

- groundwater and prevent consumption of groundwater from the shallow aquifer (where contaminant concentrations are higher than regulatory standards); and
- 2) Remediate site soils that exceed the site-specific cleanup level of 18 ppm and prevent unacceptable human contact with remaining site soils.

Table 1 lists the COCs present at the SLC-40 site. The first column lists the chemical name, the second column lists the maximum concentration detected in the impacted media at SLC-40 during the RFI, and the last column presents the clean-up level to be achieved at the site.

Please note that the groundwater COCs identified during the risk assessment process (See "Summary of Site Risk") were determined not to pose an unacceptable human health risk based on risk management considerations, so are not addressed in the remedy. However, two metals exceeded SMCLs. Although these metals did not pose a significant human health risk, exceedance of an SMCL automatically requires a remedial action.

TABLE 1—CLEANUP GOALS

Site-Related Chemicals of Concern (COCs)	Maximum Detected Concentration	Site-Specific Clean-up Level ^{1,2,3}
GROUNDWATER		
Iron	3,000 ug/L	300 ug/L
Manganese	200 ug/L	50 ug/L
SOIL		
Aroclor 1260	220 mg/kg	18 mg/kg ² , 0.5 mg/kg ³

¹ Clean-up level represents the most stringent value among USEPA and FDEP criteria at the time of the final investigation.

² Site specific cleanup level calculated for restricted access, secure, active launch facilities. This is the clean-up level that will be used during the removal action.

³ Residential Soil Clean-up level from Florida Administrative Code 62-777. For soils remaining following clean-up, application of land use controls will be applied based on this value, in order to ensure that a residential use scenario does not occur.

CLEANUP ALTERNATIVES FOR SLC-40

Clean-up alternatives are different combinations of plans to restrict site use and to contain, remove, and/or treat contamination in order to protect public health and the environment. Only two alternatives were considered because of low levels of contamination present at the SLC-40. The clean-up alternatives considered for the SLC-40 are summarized below.

No Action: Evaluation of the No-Action alternative is used as a basis for comparison with other alternatives. Under this alternative, no remedial action would be taken to reduce human health risks or restrict site use. No monitoring of COC concentrations in the groundwater would be performed and no additional contaminated soil would be excavated or otherwise remediated. It was determined this alternative would not attain the RAOs.

Soil Removal, Land Use Controls, and Long Term Monitoring: Under this alternative, material processes such as dispersion, advection, and adsorption would reduce COC concentrations in groundwater to cleanup levels over time. Groundwater would be regularly sampled and analyzed to monitor and document the decrease in contaminant concentrations. Data collected during the RFI and other Basewide assessments indicate contaminant levels will likely be reduced below cleanup levels within thirty years. A soil removal will be conducted to address all remaining soils at SLC-40 that exceed the site-specific cleanup standard of 18 mg/kg for PCBs. The risk assessment determined that this concentration would be protective of human health, as long as access to SLC-40 is restricted and it remains an active launch complex. The 45th SW would implement site-specific land use controls to protect against exposure to contaminated soils and shallow groundwater and to prevent consumption of shallow groundwater. In the long term, this remedy alternative will meet

RAOs and will also allow re-evaluation to determine if the remedy is working and provide an opportunity for change if necessary. The 45th SW, USEPA, and FDEP have entered into a Memorandum of Agreement (MOA), which outlines how land use controls will be managed at the 45th SW. The MOA requires periodic inspections, condition certification, construction project coordination, and agency notification. Site specific details can be found in the SLC-40 Land Use Control Implementation Plan (LUCIP).

EVALUATION OF REMEDY ALTERNATIVES

Each cleanup alternative was evaluated to determine how each potential remedy would comply with the four general standards for corrective measures. The four general standards for corrective measures are:

- Overall protection of human health and the environment;
- Attain media cleanup standards;
- Control the sources of releases; and
- Comply with standards for management of wastes

The second alternative (Land Use Controls, Soil Remediation, and Natural Attenuation with Long-Term Monitoring) meets each of the above criteria, while the no action alternative remedy would not meet them.

LAND USE CONTROLS AGREEMENT

By separate MOA dated 23 December 1999, with USEPA and FDEP, CCAFS, on behalf of the Department of the Air Force, agreed to implement base-wide, certain periodic site inspection, condition certification, and agency notification procedures designed to ensure the maintenance by installation personnel of any site-specific land use controls deemed necessary for future protection of human health and the environment. A fundamental premise underlying execution of that agreement was that through the USAF's substantial good-faith

compliance with the procedures called for therein, reasonable assurances would be provided to the USEPA and FDEP as to the permanency of those remedies which included the use specific land use controls.

Although the terms and conditions of the MOA are not specifically incorporated or made enforceable herein by reference, it is understood and agreed by the USAF, USEPA, and FDEP that the contemplated permanence of the remedy reflected herein shall be dependent on CCAFS's substantial good-faith compliance with the specific land use control maintenance commitments reflected therein. Should such compliance not occur or should the MOA be terminated, it is understood that the protectiveness of the remedy concurred in may be reconsidered and that additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.

WHAT IMPACTS WOULD THE CLEANUP HAVE ON THE LOCAL COMMUNITY?

There would be no impacts to the surrounding communities because groundwater underlying the site is not used for potable water. The natural attenuation and LTM alternative includes administrative actions to limit the use of groundwater until cleanup levels have been reached. Additionally, residential use of the SLC-40 is not occurring nor is it expected in the near future. As long as CCAFS remains an active gateway for the aerospace industry, SLC-40 is expected to continue operating in an industrial capacity.

Unless disturbed, the remaining soil contaminants currently do not pose a risk to site workers. Protective measures against worker exposure will be taken when and if affected soils are excavated or otherwise disturbed. Once the removal has been completed, no worker exposure concerns will remain.

WHY DOES THE 45th SW IRP TEAM RECOMMEND THIS REMEDY?

The team recommends the proposed remedy because the naturally occurring attenuation processes observed at the site (and predicted with base groundwater models) are sufficient for the removal of low concentrations of metals. Soil cleanup targets will be achieved through a removal action. The LTM program will be used to assess and document reduction in groundwater contaminant concentrations to the cleanup goals. The land use controls will also prevent exposure to contaminants prior to the cleanup levels being achieved. The proposed remedy meets the four general standards for corrective measures.

NEXT STEPS

The 45th SW IRP team will review all comments on this SB to determine if the proposed remedy needs modification prior to implementation and prior to incorporating the proposed remedy into the CCAFS HSWA permit. If the proposed remedy is determined to be appropriate for implementation, then the LTM program will be continued, the soil removal will be planned, the land use controls will be initiated, and a LUCIP will be developed and incorporated into the MOA.



LAND USE CONTROL IMPLEMENTATION PLAN

SPACE LAUNCH COMPLEX 40 SOLID WASTE MANAGEMENT UNIT 46 (SWMU NO. 46) 45TH SPACE WING CAPE CANAVERAL AIR FORCE STATION BREVARD COUNTY, FLORIDA

Facility Description

Space Launch Complex 40 (SLC-40), Solid Waste Management Unit 46 (SWMU No. 46), is located approximately 3,000 ft west of the Atlantic Ocean and 0.75 miles east of the Banana River in the northern sector of Cape Canaveral Air Force Station (CCAFS), Florida. SLC-40 was constructed in 1964 for the United States Air Force (USAF) Titan IIC Missile Program. The launch complex has continued to be an active facility. Various launch support buildings are located at the site and include a ready building, complex support building, protective clothing building, and refrigeration building. SLC-40 is currently surrounded by two security fences, is a restricted access area, and is only accessible by authorized personnel.

Location

(Reference Site Map on last page of this document)

Site Plan Coordinate	Northing	Easting
North	1538473.11	792605.67
West	1537203.41	791141.76
South	1536407.36	791818.74
East	1537741.29	793070.11

Objective

Implementation of site-specific land use controls to protect against exposure to contaminated soil and shallow groundwater and to prevent consumption of the shallow groundwater.

Land Use Controls (LUCs) to be Implemented:

Administrative:

- The property will be prohibited from residential or other non-industrial development without prior written notification to the Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection Agency (USEPA) concerning the SWMU land use change. Dependent on site conditions and the nature and intensity of the proposed land use change, additional site investigations and assessments could be required for the USAF. Based on these analyses, additional remedial measures may be required prior to land use change.

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- Perform and document baseline LUC audit upon finalization of the Statement of Basis.
- Perform and document quarterly LUC compliance inspections in accordance with 45th SW LUC Operations Manual.
- Perform, document, and report an annual audit on LUC implementation, maintenance, and compliance in accordance with the 45th SW LUC Operations Manual and the current CCAFS Corrective Action Management Plan (CAMP).
- The property Land Use Control Implementation Plan (LUCIP) shall remain in effect until:
 - a) Changes to applicable Federal and State risk-based clean-up standards occur which indicate site contaminants no longer pose potential residential risk; or
 - b) Reduction in site contaminant concentrations to below Federal and State residential risk-based clean-up standards occurs.
- In the event of property realignment, transfer, or re-use for non-industrial or non-commercial purposes, assessment and remediation may be necessary to ensure that impacts to ecological receptors are not increased or to mitigate potential ecological impacts where residual contamination exists.

Soil:

- Soils will not be disturbed or moved during property development, maintenance or construction, without:
 - a) USAF review, coordination, and approval of the proposed construction/development plans via AF Form 103 (Base Civil Engineer Work Clearance Request), 332 (Base Civil Engineer Work Request), 813 (Request for Environmental Impact Analysis), or similar process;
 - b) Ensuring proper engineering controls are in-place so that unauthorized release or disposal of the affected media does not occur. This includes conducting appropriate testing and developing a disposal plan in accordance with the LUC Operations Manual prior to off-site disposal; and
 - c) Use of proper personal protection equipment by site workers, as determined by the project proponent's occupational health and safety advisor.
- The site will be posted with proper warning signs in accordance with the LUC Operations Manual and the CCAFS Hazardous and Solid Waste Amendments (HSWA) Permit.
- The property will include fences or other similar control features to exclude trespassers in accordance with Base LUC Operations Plan.

Groundwater:

- The consumptive use of the site's surficial aquifer groundwater will be prohibited.
- Incidental consumption and dermal exposure to groundwater from the surficial

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aquifer will be prevented. This will be addressed by the project proponent's health and safety advisor.

- Groundwater will not be contacted, pumped, or discharged during property development, maintenance, or construction, without:
 - a) USAF review, coordination, and approval of the proposed construction/development plans via AF Form 103 (Base Civil Engineer Work Clearance Request), 332 (Base Civil Engineer Work Request), 813 (Request for Environmental Impact Analysis), or similar process;
 - b) Ensuring proper engineering controls are in place so that unauthorized release or disposal of the affected media (groundwater) does not occur. This includes conducting appropriate testing and developing a disposal plan in accordance with the LUC Operations Manual prior to any pumping or discharge of groundwater; and
 - c) Use of proper personal protection equipment by site workers, as determined by the project proponent's occupational health and safety advisor.
- USAF will institute a long term monitoring (LTM) program of groundwater in the surficial aquifer in accordance with an approved LTM work plan and the CAMP as part of the CCAFS HSWA Permit. Reports will be submitted annually, along with revised work plan recommendations, until such a time as the relevant regulatory agencies agree that contaminant concentrations in groundwater no longer warrant LTM.
- The site will be posted with proper warning signs in accordance with the LUC Operations Manual and the CCAFS HSWA permit.

Statement of Basis:

The Statement of Basis (SB) is currently being reviewed. It is anticipated that the SB will be accepted/incorporated into the HSWA Permit, scheduled for issuance early in 2002.

Additional Information:

Long Term Monitoring Plan: LTM is being utilized to monitor the fate and transport of manganese and iron in groundwater and potential impacts to human health and the environment. LTM will be implemented on a semi-annual basis. The scope and magnitude of the LTM program are reviewed and adjusted annually, based on the most recent data trends.

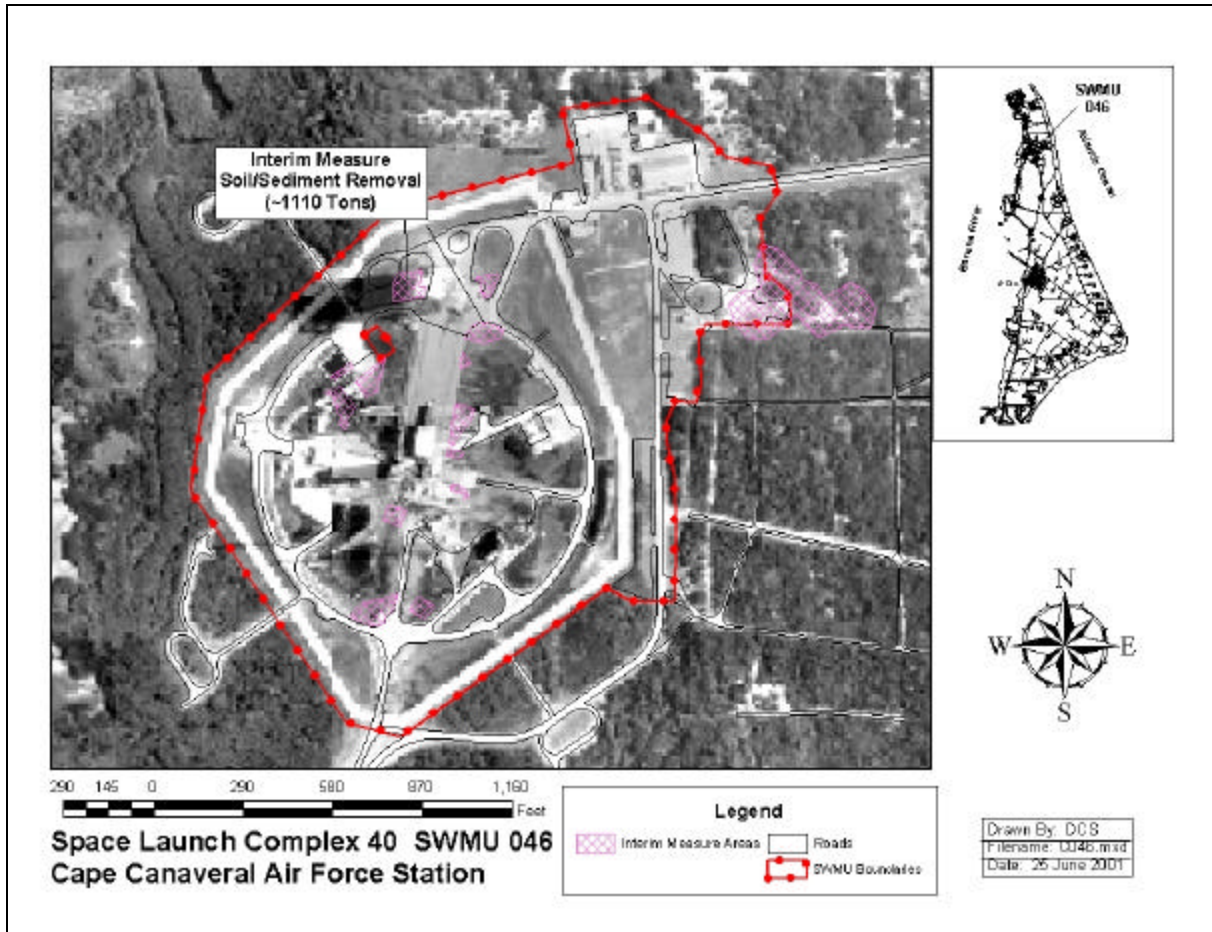
Pertinent Document Reference:

RCRA Facility Investigation Report, Space Launch Complex 40, SWMU No. 46, O'Brien & Gere Engineers, Inc., September 1999.

Environmental Cleanup Plan-PCB Interim Measure, Space Launch Complex 40, SWMU No. 46, Cape Env. Mgt., Inc., July 2000.

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Space Launch Complex 40 – Site Map



Please contact the 45 SW Installation Restoration Program Office to obtain additional information, including: the 45 SW Land Use Controls Operation Plan; the CCAFS HSWA Permit; a complete record of corrective actions at SLC-40; or other related documents, guidance, and regulations. The IRP office can be reached by phone at (321) 853-0965. Information can also be obtained via the IRP website at http://www.mission-support.org/45SW_IRP_EA